

each of said floating gates is not formed on said element separating regions, but is formed only on each of said memory transistors in said memory regions;

CF  
cont  
said control gates extending in a direction perpendicular to said one direction and intersecting said memory regions and said element separating regions, each said control gate being arranged on said element-separating insulating films in said element separate regions;

in each said memory region, both said oxide film and another oxide film are formed between each said side wall and each said floating and control gates, and are formed between each said side wall and said substrate; and

in each said element separating region, both said oxide film and said another oxide film are formed between each said side wall and each said floating and control gates, and only said another oxide film is formed between each said side wall and each element separating insulating film.

---

REMARKS:

This is in response to the final Office Action dated July 5, 2000. Reexamination and reconsideration are respectfully requested.

Applicant offers an amendment to claim 17 to address the rejection of claim 17 for lack of support. Entry of this amendment is respectfully requested as addressing a matter of form that was raised in the final Office Action.

Claim 17 stands rejected as not being supported by the application and as being indefinite. Applicant submits that the language of original claim 17 was supported by the specification. Nevertheless, applicant amends claim 17 to clarify the claim and to phrase the subject matter in a better manner. As rewritten, claim 17 recites the presence of groups of memory transistors arranged along one direction. Such a group of memory transistors is illustrated in FIG. 2(a), which represents a cross section through line A-A' in FIG. 1. Two other of such groups are illustrated in FIG. 1. Claim 17 further recites the presence of element separating regions extending along the one direction. One such element separating region is illustrated in FIG. 2(b), which represents a cross section through line B-B' in FIG. 1. Applicant submits that claim 17 is well supported by the specification and the claim 17 fully complies with 35 U.S.C. § 112.

As discussed in detail in the last response, the present invention relates to a floating gate memory where the individual transistors have a floating gate having a structure that limits damage to the tunnel oxide from the manufacturing process. In particular, the floating gate transistor preferably includes a oxide layer alongside the floating gate and control gates, sidewall spacers formed from LPCVD silicon nitride on the oxide layer and a capping nitride layer. The LPCVD silicon nitride spacers can be formed in a manner that does not degrade the tunnel oxide. The LPCVD silicon nitride spacers protect the gate oxide from subsequent processing steps using plasma processes that might introduce hydrogen to the tunnel oxide.

The Office Action rejects claims 16-17 and 5-7 over U.S. Patent No. 5,068,697 to Noda, et al. (the Noda patent). According to the Office Action, the old CCPA case of *In re Leshin* makes it obvious to replace the phosphorus silicate glass (PSG) spacers 26 of FIG. 4 of the Noda patent with silicon nitride spacers. No art of record suggests using silicon nitride spacers in the FIG. 4 embodiment of the Noda patent.

The Office Action's rejection over the Noda patent is not based on prior art, as had been the previous, now withdrawn rejection. Rather, the present rejection is premised solely on the Examiner's citation to an old case about the composition of the case of a lipstick container. *In re Leshin*, 125 USPQ 416 (CCPA 1960). In that case, the claim was for a lipstick holder having a plastic container. The prior art showed a metal lipstick holder. There prior art also included a reference, identified as Anderson, that suggested using a plastic container. The Examiner found it obvious in that case to combine the references and produce the claimed plastic lipstick container. That conclusion was affirmed by the CCPA.

By contrast, in the present application there is no reference that suggests using silicon nitride instead of PSG in the Noda patent's structure. As such, the rejection is not based on the prior art and should be withdrawn. *In re Leshin* does not support the present rejection because no art suggests making the modification identified in the prior art.

The fact that the Noda patent places *doped* silicate glass next to the tunnel oxide, the floating gate and the tunnel gate indicates that the Noda patent's inventors had no appreciation of the problems presented by impurity diffusion. Rather, the Noda patent places a source of impurities – dopants – immediately adjacent the tunnel oxide, floating gate and control gate. As such, the Noda patent does not suggest that the PSG spacers 26 of the Noda patent's FIG 4 embodiment should be replaced with silicon nitride to prevent damage to the tunnel oxide.

The fact that an invention seems simple in hindsight does not make the invention obvious.

Applicant notes that the Office Action has disregarded the recitation of "silicon nitride film formed by low-pressure CVD" asserting that this is a product by process limitation. Applicant submits that it is apparent from this application that LPCVD silicon nitride is a different material than plasma deposited silicon nitride. As such, even if this is a product by process recitation, the Office Action has failed to account for the actual product that is produced. LPCVD silicon nitride has material properties that distinguish it.

Applicant has filed a notice of appeal. Favorable early reconsideration of the outstanding rejection is respectfully requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number 213-337-6700 to discuss the steps necessary for placing the application in condition for allowance.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

By: 

William H. Wright, R.N. 36,312  
Attorney for Applicant(s)

Date: January 5, 2001

Biltmore Tower, Suite 1900  
500 South Grand Avenue  
Los Angeles, California 90071  
Phone: 213-337-6700  
Fax: 213-337-6701